

REMARKS

Claims 1-10 are pending in the application. Claims 1-3 and 9 are rejected. Claim 6 is objected to but would be allowable if placed in independent form. Claim 10 is allowed. Claims 4, 5, 7 and 8 are withdrawn from consideration.

Applicants have amended claim 6 to place it into independent form. Applicant also has amended claims 1 and 9 in a manner that would distinguish the invention over the newly cited combination of references. Applicants respectfully submit that the present change already has been at issue during prosecution of the present application and that no new matters are raised and no further search is required. The change makes the claims clearly patentable and the places the application into condition for allowance.

Drawings

The drawings are objected to under 37 C.F.R. § 1.83(a) because they do not show every feature of the invention specified in the claims. The Examiner asserts that the language of claim 1, which requires "the inlet (7b) having a diameter that is slightly greater than the diameter of a flat bottom face (32b) of the valve body (3), the flat bottom face being positioned within the inlet," is not shown in the figures. Applicants note that this feature is expressly taught at page 5, lines 4-6. Applicants respectfully submit that the feature is, in fact, disclosed by virtue of the illustration in Fig. 2 in combination with the text at page 5. The recitation that the flat bottom face is positioned within the inlet may be seen in Fig. 2. The recitation that the diameter of the inlet is slightly greater than the diameter of the flat bottom face 32b, while not precise in the Figures, is adequately illustrated, as the drawings are simply schematics and are not intended to be drawn to scale.

Claim Objections

Claims 1 and 9 are objected to because the language "flat bottom face of the valve body" is not found in the specification. The Examiner acknowledges that the structure defined by this language is already disclosed in the specification. However, it appears that the Examiner

wishes to see this precise language in the disclosure. Accordingly, Applicants have amended the text at page 3, line 25.

Claim Rejections - 35 U.S.C. § 103

Claims 1, 2, 3 and 9 are rejected under 35 U.S.C. §103(a) as being unpatentable over Peterson, Jr. (6,769,625) in view of Rieger et al (6,814,309). This rejection is traversed for at least the following reasons.

The Examiner presents an analysis of claims 1 and 9 which compares the structure of the claims to the teachings of Peterson, particularly Figs. 2A and 2B. The Examiner admits that Peterson does not disclose a flat bottom face of the illustrated valve body having a diameter smaller than the inlet such that the valve body is positioned within the inlet when the valve body is closed.

The Examiner looks to Rieger et al for a disclosure of a fuel injector having a valve body with a flat bottom face that is positioned within an inlet, particularly as illustrated in Figs. 1 and 2. The Examiner asserts it would have been obvious to one of ordinary skill in the art to substitute the valve body of Peterson with the valve body of Rieger et al in order to provide a more effective fuel injector.

Rieger illustrates in Figs. 1 and 2 a valve closure member 7 that cooperates with valve seat surface 8, which is shaped as a frustum of a cone and arranged in valve body 1 to form a sealing seat 9. The flat surface appears to fit within the inlet opening, as illustrated in Fig. 1. A clear difference, however, is that the valve closure member 7 in Rieger et al is not a ball having a flat space 32b formed by cutting a lower end of the ball 32. Further, the valve body is not the combination of a barrel shaped anchor 31 and a ball 32, as disclosed with regard to the embodiments of the present invention.

Applicants have now defined the valve body member of claim 1 as comprising a ball with the flat face. This would clearly distinguish over Rieger et al. Moreover, there is no teaching or suggestion as to why or how the ball of Pederson would be cut to provide a flat surface, on the basis of the teachings of a cylinder in Rieger et al. There are technical advantages to the claimed structure as compared to a cylindrical member as illustrated in Rieger et al, for example, the ball

may provide a greater surface area to interface with the valve seat. The amendment also includes a clarification of the “closed” position of the valve.

Claim 9 is similarly amended to recite a valve body including a ball-shaped portion with a flat bottom face.

In rejecting claim 2, the Examiner notes that the fuel passages shaped as a cone having a diameter that gradually and continuously increases away from the outlet of the injection port, as illustrated in Figs. 2A and 2B. In this case, Applicants note that the interface between the ball 126a and the seat surface in Pederson is primarily at the perimeter of the opening of the fuel passage. A greater surface area is in contact with the present invention, thereby providing greater sealing capacity. This offers a significant distinction in performance.

As to claim 3, the Examiner finds the inlet to be shaped like the frustum of a cone, as in Figs. 2A and 2B of Pederson. Claim 3 would be patentable for reasons given with respect to claim 2.

All other claims, including the withdrawn claims, would be allowable due to their dependence on claim 1.

Allowable Subject Matter

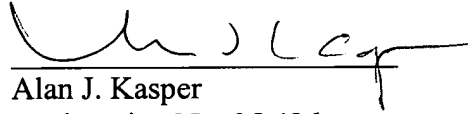
Applicants note with appreciation that claim 10 is allowed. Applicants also note that claim 6 is objected to, but would be allowable, if placed in independent form. Applicants note that claim 6 has been placed into independent form in order to secure its allowability.

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

Amendment Under 37 C.F.R. § 1.116
U.S. Application No. 10/797,103

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,



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